

## 科學與社會 -- 科學與社會的互動

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科學與社會的互動 [2]

科學與社會的互動 STEM (science, technology, engineering and mathematics) 科學與社會的互動

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Deepmind [3]

AlphaGo Master 0000000000 AlphaGo Master00000AlphaGo Master 000000000  
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AlphaGo Zero 4000 AlphaGo Master 4000 AlphaGo Zero 1000000[4] 1000000  
AlphaGo Master 1000000000 16 1000000 AlphaGo Zero 1000000000 18 1000000  
AlphaGo Zero 14 16 45 1000000000000

1. Nature Magazine AlphaGo Deepmind AlphaGo Zero AlphaGo Master

2) AlphaGo Zero local trap  
AlphaGo Zero Alpha

[AlphaGo Zero](#), [AlphaGo Master](#), [AlphaGo Master](#), [AlphaGo Master](#), [5], [Nature Magazine](#), [AlphaGo Zero paper](#), [AlphaGo Master](#), deep-learning

AlphaGo Zero AlphaGo Master AlphaGo Master

AlphaGo Zero [6] game

Superhuman  Clock  IBM S/360  AlphaGo Zero  superhuman  IBM S/360  AlphaGo Zero  Nature Magazine  AlphaGo Zero paper  superhuman

superhuman Technological Singularity  
Demis Hassabis AlphaGo

**Alpha**

Deepmind team

Alpha

Alpha

Alpha

AlphaGo Zero AlphaGo Zero superhuman [7] superhuman

superhuman deep-learning reinforcement superhuman

AlphaGo Zero AlphaGo Master AlphaGo Master superhuman AlphaGo Master 60 AlphaGo Master superhuman AlphaGo Master AlphaGo Zero superhuman superhuman [8]

Alpha Alpha

Alpha Turing Machine deep-learning Alpha Deepmind AlphaGo Zero AlphaGo Master AlphaGo Zero AlphaGo Zero

Deep-learning credit reinforcement credit reinforcement local trap

leukotomy reinforcement peer review Socratic method peer review Socratic method peer review

ideas are cheap idea cheap reinforcement [9]

AlphaGo reinforcement

[10]

[11]

[12]

Turing Machine local trap Universal approximation

Socratic method  
Superhuman

Superhuman

[illegible]

Alan Turing Geoffrey Hinton Demis Hassabis  
AlphaGo

Demis Hassabis    AlphaGo    [13]

Geoffrey Hinton

[illegible]

Dialogue Concerning the Two Chief World Systems [14] Socratic method [15]

The Sceptical of Chemist

# On the Origin of Species

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## Leukotomy BRIAN Initiative

Leukotomy □□□□□□□□□□

1 personalities mental diseases personalities   
 BRAIN Initiative project

2) leukotomy Leukotomy BRAIN Initiative AlphaGo

3) personality intelligence Walter Freeman personality intelligence

BRAIN Initiative project NIH BRAIN 2025 Report “there is general agreement that types can be defined provisionally by invariant and generally intrinsic properties” invariant agreement insights “envision an integrated, systematic census of neuronal and glial cell types” dynamic brain mapping “Link brain activity to behavior” “Produce conceptual foundations for understanding the biological basis of mental processes” mental processes behavior

BRAIN Initiative project personality intelligence brain mapping personality intelligence hidden assumptions

personality intelligence

BRAIN Initiative project brain mapping mental diseases personality intelligence personality intelligence leukotomy

leukotomy Alpha

personality intelligence mental diseases

BRAIN Initiative brain mapping human level intelligence personalities intelligence mental diseases BRAIN Initiative neurosciences AlphaGo generic human intelligence Alpha neurosciences [18]


AlphaGo Master AlphaGo Zero AlphaGo AlphaGo Master Alpha

Alpha

Technological Singularity BRAIN Initiative project

[illegible]

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[2] 

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[illegible][illegible]



[4] <http://www.alphago-games.com/> AlphaGo Zero AlphaGo Zero  
<https://www.101weigi.com/chessbook/player/38348/>



[6] [OpenAI GPT-4o](#) superhuman [Alpha](#)


Turing Machine limitation  
 Alpha


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Alpha





Google/Deepmind Alpha

[7] <http://www.alphago-games.com/> Full Strength of AlphaGo Zero, i.e. Final Form 40 Blocks 20 Blocks Not Full Strength of AlphaGo Zero AlphaGo Zero superhuman

[8] 

[9] 2012 [Show, don't tell](#) [show](#) [Socratic method](#) [tell and discuss](#)

Ideas are cheap

[10] 田口玄二:"Go gaming is strictly defined within a very small space. Industrial automations are typically designed in well controlled environments, but not strictly defined. Car driving is regulated, but the environment is not well controlled"田口玄二 田口玄二博士の人生と研究

[illegible]

[11] AlphaGo Master 60+3

[illegible]

[illegible]

[13] Google DeepMind AlphaGo Master defeated world champion Lee Sedol in the Go game.

AlphaGo

[15] Alpha  
Alpha

[illegible][illegible][illegible][illegible]



[18]  $\mathbb{R}^n$  上的任意两个向量  $\alpha, \beta$  满足  $\alpha \cdot \beta = 0$  当且仅当  $\alpha$  与  $\beta$  正交。  
证明：设  $\alpha = (a_1, a_2, \dots, a_n)$ ,  $\beta = (b_1, b_2, \dots, b_n)$ ，则  $\alpha \cdot \beta = a_1 b_1 + a_2 b_2 + \dots + a_n b_n$ 。  
若  $\alpha$  与  $\beta$  正交，则  $\alpha \cdot \beta = 0$ 。  
反之，若  $\alpha \cdot \beta = 0$ ，则  $\alpha$  与  $\beta$  正交。